in the gas pipe, and thus allow the piece of iron in that chamber to drop into its original position, and thereby reduce the gas flame at once to its lowest point.

By these means the raising and lowering of the gas is accomplished with less strain upon the clock than it would be were a stop-cock employed.

In order to prevent the action of extraneous light during the day, it has been found advisable to place between the lens and the thermometer, a small screen, which is opened and shut by the action of the same lever that raises and lowers the gas. The thermometer is thus exposed only while the gas flame is at its height.

For the successful production of the images of the mercurial column in the thermometer tube, every thing depends on the light being made to fall upon it at the proper angle, so as to obliterate the shadow from the empty part of the bore, and increase the shadow produced by the full portion. Unless this position be hit the images will not be distinct.

As it appeared desirable to have it in our power so to arrange matters that the clock might be inside of the house, while the thermometer and registering cylinder stand outside, I have contrived a method by which this may be accomplished. It is on the same principle as that by which the gas is raised and lowered, and may be managed by the same lever, so that the shifting of the cylinder takes place at the same instant that the gas is lowered, just after the registration has been completed. The only connexion between the clock and the cylinder is a thread, which may pass through the window. I have had this plan in action, but the apparatus requires some little alteration.

By this arrangement it is easy to cause the same clock to register both a thermometer and a barometer, or even a barometer and two thermometers, one placed in the sun, the other in the shade; while the registration of the barometer may be either by the photographic method, or by the mode previously invented by Mr. Bryson. Ed. Philos. Jour.

On "Gutta Percha," a peculiar variety of Caoutchouc. By Douglas Maclagan, M. D., F. R. S. E., &c. Read before the Royal Scottish Society of Arts, 23d June, 1845.

Gutta Percha is the Maylayan name for a substance which is the concrete juice of a large forest tree, native of the shores of the Straits of Malacca, Borneo, and the adjacent countries. The tree yielding it is unknown botanically, all the information we possess regarding it being, that it is a large forest tree, and yields this product abundantly. We are indebted for our knowledge of it to Dr. W. Montgomerie, H. E. I. C. S., whose spirited exertions to improve the cultivation of various articles of colonial produce at Singapore have obtained for him several distinguished marks of approbation from the Royal Society of Arts of London. For his communication regarding gutta percha, Dr. Montgomerie received a silver medal from the Society

This substance, in its crude state, differs, in many particulars, from common caoutchouc. It is of a pale-yellowish, or rather dirty-white, color. It is nearly as hard as wood, though it readily receives the impression of the nail. It is very tenacious, and not at all elastic.

It seemed to me to be worth while to determine, whether or not this substance really was a variety of caoutchouc, and for this purpose I subjected it to the ordinary process of ultimate analysis, and obtained as its per centage composition, carbon, 86·36; hydrogen, 12·15; the remainder, 1·49, was most probably oxygen absorbed from the air during the process employed for purifying it, as the substance, whilst heating on the vapor-bath, acquired a brown color. The only analysis of common caoutchouc with which I am acquainted is that of Faraday, who obtained, carbon, 87·2; hydrogen, 12·8. The results are sufficiently near to warrant the conclusion, that the two matters in question are generically the same.

I found, also, that the gutta percha yields the same product of destructive distillation as the common caoutchouc. Without entering into details, I may briefly state, that both equally yield a clear, yellow, limpid oil, having no fixed boiling point, and, therefore, being a mixture of different oleaginous principles. In both instances, the distillation proceeds most freely at temperatures between 360° and 390° Fahr., and seems almost stationary at 385°. Comparative analysis of similar portions of the two oils were made, and, as is already known of common caoutchouc, the products exhibit a constitution represented by the formula $C_{10} H_8$. The gutta percha thus appears really to be a modification of caoutchouc.

In its general properties it likewise shews a similarity to common caoutchouc. It is soluble in coal naptha, in caoutchouc oil, and in ether. It is insoluble in alcohol and in water, and floats upon the latter.

Its most remarkable and distinctive peculiarity is the effect of heat upon it. When placed in water at 110°, no effect is produced upon it, except that it receives the impression of the nail more readily; but when the temperature is raised to 145° degrees or upwards, it gradually becomes so soft and pliant as to be capable of being moulded into any form, or of being rolled out into long pieces or flat plates. When in the soft state, it possesses all the elasticity of common India-rubber, but it does not retain these properties long. It soon begins again to grow hard, and in a short time, varying according to the temperature and the size of the piece operated on, regains its original hardness and rigidity. A ball one inch in diameter was completely softened by boiling water in ten minutes, and regained its hardness completely in less than half an hour. It appears to be capable of undergoing this alternate softening and hardening any number of times without change of property.

It is also to a certain extent ductile. When soft it is easily torn across, but when hard it is very tenacious. A piece not an eighth of an inch in thickness, when cold, easily raised a weight of forty-two pounds, and only broke when half a hundred weight was attached to it.

From these properties, it seems capable of many applications in the arts. Its solution appears to be as well adapted as that of common caoutchouc for making water-proof cloth, and, whilst softened, it can be made into solid articles, such as knife-handles, door-handles, &c. Malays employ it for the former of these, and prefer it to wood. A surgeon, furnished with a small piece, could easily, with the aid of a little hot water, supply himself with bougies or pessaries of any size or form.

[Dr. M. exhibited a knife-handle, a walking-cane head, a riding-whip, and other articles, made of gutta percha.] Ibid.

Instructions for Observing the great Symmetrical Barometric Wave. By W. R. Birt.

The notice of my report on Atmospheric waves, published in the *Athenæum*, [No. 923,] contains an allusion to the recurrence of a wave of a most remarkable and interesting character. From the 11th to the 18th of November, in the year 1842, the barometer was observed to rise at London from below 29 inches to about 30½ inches, with occasional depressions, so that on projecting the observations in a curve, it was found to be indented. After passing its maximum on the 18th, the barometer gradually fell until the 25th, when it stood slightly above the same altitude as observed on the 11th. This fall was interrupted by occasional elevations, which were of such a character as to give the whole curve of rise and fall an extremely symmetrical appearance, the descending branch being almost a counterpart of the ascending. The same symmetry was observed at Dublin and Munich. On projecting the observations at these stations, allowance having been made for difference of longitude, the motion of the wave, from Dublin to Munich, became very apparent, and no doubt could be entertained of its transit in that direction; (the reader is referred to an engraving of the wave as it passed the three stations, Dublin, London and Munich, accompanying Sir John Herschel's report on 'Meteorological Reductions,' in the report of the Thirteenth Meeting of the British Association for the Advancement of Science.) An examination of observations made at stations situated to the north-east and south-west of the line joining Dublin and Munich, shows that the symmetrical character of the wave (or at least of the barometric projections) was confined to *that line*, for, on either side, the symmetry is departed from, the character of the rise on one side being transferred to the fall on the other—the line from Dublin to Munich being, with regard to the barometric movements of the fourteen days, a kind of axis.

The barometric oscillations during the fourteen days, from November 7th to 21st, in the year 1843, again afforded a symmetrical wave or curve. The indentations or inflexions of the rise and fall in 1843 were *not* similar to those of 1842, but the same period, and the rise above thirty inches, clearly showed that on abstracting the *secondary* oscillations, the *same* or a very *similar* cause operated on the baro-